

Patent Claims

1. An actuator with a simple function for the control of a friction clutch in the drive train of a motor vehicle having a cylinder/piston unit for generating the contact pressure of the clutch, in conjunction with which a controllable electric motor/pump unit (3) provides a pressure medium and is connected to the cylinder/piston unit (1) via a self-regulating valve unit (2), so that the clutch is controlled by actuating the motor/pump unit (3), **wherein** the self-regulating valve unit (2) contains: a dump valve (8;8';28;38), which responds to the prevailing pressure on the side of the pump facing towards it, and a nonreturn valve (9;29) between the two units (1,3), which permits a flow to take place only in the direction from the electric motor/pump unit (3) to the cylinder/piston unit (1), and in that the electric motor/pump unit (3) is reversible, as a consequence of which its supply flows in the opposite direction when in the reversed state, as a result of which opening of the dump valve is accelerated.

2. The actuator as claimed in claim 1, **wherein** the dump valve (8;8';28) consists of a sleeve (10;10') and a spring-assisted slide (12;12';32) therein, which sleeve has at least one first opening (11,11'), through which pressure medium from the cylinder/piston unit (1) can flow, and which

slide (12;12';32) is capable of being displaced between a first position, in which it exposes the opening (11;11'), and a second position, in which it conceals the opening (11;11').

3. The actuator as claimed in claim 2, **wherein** the force of the spring (14;14) predominates in the first position of the slide (12;32), and the force exerted by the pressure medium on it predominates in the second position.

4. The actuator as claimed in claim 3, **wherein** the slide of the dump valve (8;28) is executed as a piston (12;12';32), which forms a first (13;13') and a second (17;17') chamber in the sleeve (10), of which the first chamber (13;13') is capable of communicating with the cylinder/piston unit (1) via the opening (11;11') and possesses an outlet (15), and of which the second chamber (17) communicates with the electric motor/pump unit (3).

5. The actuator as claimed in claim 4, **wherein** the nonreturn valve (29) is contained in the slide (32), for which purpose the slide (32) exhibits at least one second opening (34), which is in alignment with at least the one first opening (11) with the slide in one position, in which position the slide (32) obstructs the communication between the first opening (11) and the outlet (15) (Fig. 3).

6. The actuator as claimed in claim 1, **wherein** the effect of the spring (14) supports the movement of the slide (12;32) into the first position.

7. The actuator as claimed in claim 8, **wherein** the effect of the spring (14') on the slide (12') must be overcome by the feed in the opposite direction, in order to bring it into the first position.

8. The actuator as claimed in claim 1, **wherein** a controller (21) is provided for the control of the electric motor/pump unit (3), which receives a set point value corresponding to the pressure piston/cylinder unit and an actual value corresponding to the pressure piston/cylinder unit as input signals.

9. The actuator as claimed in claim 1, **wherein** the spring (14; 14') of the dump valve (8;28) and the spring of the nonreturn valve (9'';29'') are dimensioned in such a way that, as the pressure of the pressure medium rises, the outlet opening (11) is closed first, and the nonreturn valve (9;29) is opened only once that has taken place.